

Rose, headmaster of Caterham Board School, has much in it that others less nearly connected with the work might fail to recognise, and will prove well worthy of careful examination when it is printed.

The remainder of the programme is as follows :—

Thursday, July 31, chairman, Sir George Kekewich, K.C.B., Secretary to the Board of Education. Address on "Nature-Study in Colleges and Higher Schools," by Prof. Miall, F.R.S. Selected speakers :—"Nature-Study in Girls' Secondary Schools," Miss Mary Gurney; "Plant Life as Nature-Study," Mr. Scott Elliott; "School Gardens," Mr. T. G. Rooper; "Geology as a Branch of Nature-Study," Prof. Grenville Cole.

Friday, August 1, chairman, the Right Hon. Sir W. Hart-Dyke, Bart., M.P. Address on "The Training of Teachers in Nature-Study," by the Rev. Canon Steward. Selected speakers :—"The Relation of Nature-Study to School Work and to the Home," Sir Joshua Fitch; "Nature-Study as an Element of Culture," Mr. M. E. Sadler; "School Rambles and the Training of Teachers," Mr. J. H. Cowham; "The Present Work of the County Councils," Mr. H. Macan.

In conclusion, it must be said that the work of bringing the undertaking to such a successful issue has taken the whole time and energy of Mr. J. C. Medd, the honorary secretary, who has had at his disposal the great experience and the marvellous tact of Sir John Cockburn, the chairman of the Association; Mr. Cundall, of the Victoria and Albert Museum, Mr. A. T. Simmons and Mr. A. Taylor, H.M. sub-inspector, to whom the task of arranging the exhibits was allotted, must also be given a full measure of praise. WILFRED MARK WEBB.

NOTES.

THE members of the new Order of Merit were entertained at dinner by the Athenæum Club on Friday last. Science was represented by four of the twelve members of the Order—Lord Rayleigh, Lord Kelvin, Lord Lister and Sir William Huggins. Lord Avebury (trustee of the club) presided, and among other members present were many leaders of science, art and literature.

A NEW laboratory for the study of experimental psychology has been instituted at King's College, London. The laboratory will be in charge of Dr. W. G. Smith, under Prof. Halliburton's general supervision.

THE *Times* states that during her passage from Kronstadt to Kiel the Italian cruiser *Carlo Alberto* carried out some important experiments in wireless telegraphy under the personal direction of Mr. Marconi. Signals were exchanged with stations 2000 kilometres distant, 1000 kilometres by sea and 1000 kilometres by land.

PROF. F. A. FOREL writes from Morges to say that he has made inquiries into the report that after a shower of rain at Frauenfeld, Canton Thurgau, Switzerland, the ground was covered with a thin layer of ashes of greyish-blue colour (p. 306). A teacher of natural history at Frauenfeld has informed him that the news was misleading and that the dust was not of volcanic origin.

A TELEGRAM from Kingstown, St. Vincent, states that there have been two slight eruptions of the Soufrière volcano since July 21, and an earthquake in the north-eastern part of the island. The cable steamer *Newington*, which is working eighteen miles to the north, reports that the depth of the sea has increased in that locality to a mile and a quarter.

THE *Daily Mail* correspondent at Madrid reports that two large cliffs near the town of Calataynd, in Aragon, have fallen down, destroying several houses and injuring many people. A crater has opened in the Pico de Europa mountains, which

separate the provinces of Santander and Asturias. A great column of vapour is issuing therefrom, and the people are in a state of alarm, fearing a volcanic eruption. A Central News despatch from the Azores states that there has just been a terrific submarine volcanic eruption off Horta. Masses of rock in a state of incandescence were thrown up, and the people became panic-stricken. A Reuter despatch from San José, Costa Rica, states that there has lately been unusual activity among the Costa Rican volcanoes, considerably affecting the land in the neighbourhood of Terraba. From New York another Reuter despatch records that an earthquake shock was felt shortly after midday on Monday, July 28, in parts of Nebraska, Iowa and South Dakota, but no damage was done. Three shocks have also occurred in the Lompoc Valley, California, since Sunday evening, July 27. Cracks appeared in the earth and there was widespread panic among the inhabitants. Vibrations have also been felt at other places in California.

THE *Westminster Gazette* on Saturday last devoted a column and a half to the Armstrong-Orling system of wireless telegraphy. We have referred on two or three occasions to this system, the receiving apparatus of which was described in these columns last December. We now understand that a company is about to be registered to manufacture and supply the transmitters and receivers. It is stated that apparatus has been worked out suitable for wireless signalling up to a distance of twenty miles, the ground being used as a conductor, and that it will be sold, at a very cheap rate, for private installations. Details of a technical nature are, however, entirely wanting, and without these it is impossible to form any opinion of the system. So far as we know no description of the transmitter has been published, although we were told eight months ago that it was proposed to read a paper upon it before one of the scientific societies. We have also consulted the patent files, but there is nothing in Mr. Orling's name as yet printed which is specially novel or remarkable. It is therefore advisable to wait until further particulars are available before deciding whether the "programme of amazing promise" sketched in the *Westminster Gazette* is likely to be realised.

WE regret to see the announcement of the death of the Rev. Charles E. Searle, master of Pembroke College, Cambridge, and formerly college lecturer in mathematics.

IN the House of Commons on Monday, Mr. J. A. Dewar asked whether it could be made a condition of the annual grant of £5,300 to the Meteorological Council that the high-level and low-level observatories at Fort William should be kept in a state of efficiency, or whether an additional contribution towards the expenses of properly maintaining these observatories would be considered. In reply, Mr. Balfour said he had been advised it would not be desirable to impose conditions on the Meteorological Council or to inquire into this or that particular observatory. He was not prepared to give an answer to the last part of the question.

THE decision to close the observatory on Ben Nevis was discussed at the general meeting of the Scottish Meteorological Society, held in Edinburgh last week. Lord Maclaren, who presided, said that the observatory would have to be closed because there were no funds available for carrying on the work. He thought it was a case for inquiry, and if the Government appointed a committee to take evidence, probably the difficulties would be overcome. Sir John Murray, as one of the original directors, said it was not their intention to found a permanent institution, but only to make an experiment of high-level observations. The experiment had been most satisfactory in every respect. But the observatory must now be closed unless one of two things happened; either the State must take over

the observatory, or the directors must be put in possession of 12,000*l.* worth of consols to enable them to carry it on for another meteorological cycle.

PRINCE AUGUSTE D'ARENBERG, president of the Suez Canal Company, has sent a letter to the president of the Liverpool School of Tropical Medicine asking for the cooperation of the school in a concerted effort to cope with the prevalence of malaria in Ismailia, and making a formal request for the services of Major Ronald Ross, C.B., F.R.S., to start operations there against mosquitoes. The committee of the school has acceded to the request, and is making arrangements to enable Major Ross to proceed to Ismailia in September next, when malaria is especially prevalent. Major Ross will begin by starting an organised campaign against malaria, and will go out again later in the year to carry it through.

THE Prince of Wales has consented to act as president of the fund which has been established for the purpose of conducting research into the nature, causes and cure of cancer. The vice-presidents of the fund are the Lords Lister and Strathcona, the Right Hon. Arthur Balfour, Sir Frederick Bramwell, Sir William Broadbent and Mr. Bischoffsheim. The executive committee is composed of Sir W. Broadbent, Sir W. Church, Sir H. Howse, Drs. Sydney Martin, Pye-Smith and Rose Bradford, Prof. Sims Woodhead, and Messrs. Langton, Henry Morris, Butlin, McFadyean and Watson Cheyne. The money contributions actually paid amount to 32,391*l.*, and promises of 4100*l.* more have been received, making a total of 36,491*l.* towards the full amount of 100,000*l.* originally asked for. Work will be commenced with the sum in hand, but it is hoped that the full capital required will be subscribed.

NATURAL science in Ceylon has sustained a severe loss by the untimely death of Mr. Oliver Collett, F.R.M.S., who, while carrying on actively his vocation as a tea planter, found time for excellent original work both in the field and laboratory. He devoted himself especially to the Mollusca; and a genus and several species of land shells bear his name. As a member of the Ceylon branch of the Royal Asiatic Society he contributed various papers on zoological questions. He also brought his scientific knowledge to bear on some economic questions in connection with the cultivation of tea, and was much esteemed by his fellow planters, being at the time of his death chairman of the local Planters' Association. Mr. Collett, who was thirty-five years of age, possessed a very attractive personality, and many, both at home and in Ceylon, who were brought in contact with him by common interests, deplore the loss of a charming friend and an enthusiastic naturalist. He died on June 13 somewhat suddenly at Colombo, from an attack of dysentery.

A MEETING of the Institution of Mechanical Engineers was held at Newcastle on Tuesday and Wednesday, July 29 and 30. Among the papers down to be read were:—"Liquid Fuel for Steamers," by Mr. E. L. Orde; "Some Experiments on Steam-Engine Economy," by Prof. R. L. Weighton; "Pumping Plant for Condensing Water," by Mr. Charles Hopkinson; "Mechanical Appliances in Mines (Drilling and Coal Cutting)," by Mr. R. H. Wainford; "Recent Developments in Pneumatic Tools and Appliances," by Mr. Ewart C. Amos; and "Motor Cars of 1902," by Captain C. C. Longridge.

A FEW weeks ago (July 3, p. 227) we gave a short account of the investigations into the connection between the magnetic currents in the earth and the Aurora Borealis, which Prof. Kr. Birkeland conducted in the winter of 1899-1900 at two stations Talvik and Haldde, on the summits of two mountains to the west of Bossekop, Altenfjord, in Lapland. Prof. Birkeland

recently left Christiania for Archangel in order to start from there on July 23 and proceed to Matoschkin Strait, Nova Zembla, to organise and set in working order a similar station and leave it in the hands of four observers before returning to Norway. At Bossekop, where observations will also be made, the observatory is admirably situated on the summit of Haldde Mountain; for at the base a tunnel belonging to a copper-mine runs for 250 metres into the mountain, and registering apparatus can be set up in it. Simultaneous observations can thus be made on the electrical currents in the atmosphere and in the earth. The third station will be on Axel island, Spitsbergen. A fourth station, with two observers, will be at Dyrafjord, Iceland, and researches will be carried on for about a year at all of them. In order to supplement his own observations and compare them with others, Prof. Birkeland has invited more than a hundred magnetic and meteorological observatories to make simultaneous observations, and has received promises of co-operation from many of them.

WRITING from St. Petersburg on July 22, Mr. J. F. Baddeley gives in the *Times* a few details of a serious glacier disaster in the Caucasus, news of which has been received from Vladikavkaz. Between Mont Kazbek and Ghimarai Khokh a glacier descends into the narrow wedge-shaped valley of the Ghenal Don, which, after a course of about thirteen miles, nearly due north, joins the Ghizel Don, a tributary of the Terek. Like most of the glaciers in the Caucasus, that of the Ghenal Don has of late years receded considerably, and some thirty years ago copious springs of hot sulphur water were uncovered, which had formerly made their presence known by the steam that forced its way through the ice. About the middle of July the end of the glacier suddenly broke off and slid down the valley, causing the loss of thirty-two lives. On July 19 another huge block of ice broke off and followed the first with terrible rapidity for eight miles down the Ghenal Don. Similar catastrophes have frequently occurred on the Georgian Road, in the valley of the Terek, owing to icefalls from the Devdoraki Glacier, north and slightly east of Kazbek; but Mr. Baddeley says he has not met with any mention of previous cases in connection with the Ghenal Don.

EVIDENCE that the competition of the electrical tramway is making itself seriously felt is afforded by the fact that the North-Eastern Railway Company has decided to start working some of its local lines near Newcastle-on-Tyne electrically, and has already invited tenders for the electrical equipment of the substations, permanent way and coaches. It is also reported that the Lancashire and Yorkshire Railway Company is about to make a practical test of electrical running on one of its branch lines near Manchester.

A RECTIFIER for alternating currents devised by Messrs. G. H. Morse and C. R. Cushman is described by the former in the *New York Electrical World and Engineer* for July 19. An electric arc is burnt between three carbon points which are placed in a strong magnetic field; the arc burns between the upper carbon and one or other of the lower carbons, according to the direction of the current. The alternating current is thus divided into two pulsating direct currents, and experiments have shown that, with a proper adjustment of the strength of the magnetic field, the length of arc, &c., the rectification can be made practically complete; that is to say, two direct currents can be obtained each equal to half the alternating current.

ELECTROCHEMISTRY has made enormous strides on the continent and in America. But chemists and electricians in this country have, for some reason best known to themselves, shown a want of interest which is absolutely astonishing. Almost every university and technical institute in Germany has

an electrochemical laboratory, or if there is no special laboratory at least the subject is taught, and the same may be said of America. France also is making considerable headway in the teaching of electrochemistry. Here in this country the whole subject has been practically ignored. In order to try to bring the claims of this very important science before the scientific world and to interest manufacturers in electrochemistry, a small committee of electricians and chemists has been sitting since March in order to see whether it would not be possible to form a British Electrochemical Society. A fair amount of support has been promised, and the committee is now sending out circulars inviting cooperation in the formation of the proposed society. It is to be hoped that there will be a ready response to the invitation, so that all who are interested in electrochemistry may combine their efforts to promote its advancement in this country.

INTERNATIONAL balloon ascents were made on the morning of March 6 in France, Germany, Austria and Russia, and kites were also sent up by Mr. Rotch at Blue Hill, Boston, U.S.A., on the previous evening. The following are some of the preliminary results of the highest unmanned ascents:—Itteville (near Paris), temperature at starting, $2^{\circ}8\text{C}$.; greatest height reached, 14,000 metres; lowest temperature recorded, -67°C . Strasbourg, temperature on ground, $-0^{\circ}4$; at 9300 metres, -54°C . At Blue Hill the kites ascended through a thick snowcloud; the lowest temperature, -7°C , was recorded at a height of 1658 metres; above this the temperature rose, and at a height of 2000 metres it reached $-2^{\circ}4$. Over Europe an area of high barometric pressure prevailed, while at Blue Hill the kite rose on the north-west side of a deep depression, the centre of which lay over the Atlantic.

THE results of the meteorological observations made at the Rousdon Observatory, Devon, during the year 1901 have been published by the Hon. Lady Peek. The observations have been regularly made, as hitherto, by Mr. C. Grover, and the tables have been prepared for publication under the supervision of Mr. W. Marriott, assistant secretary of the Royal Meteorological Society. The volume also contains an account of damage done by lightning to a room occupied by two persons on the night of June 29–30. The results of this valuable series of observations for the years 1884–1900 are discussed by Dr. J. Hann in the current number of the *Meteorologische Zeitschrift*, chiefly from tables given in the previous volume (1900). In this discussion Dr. Hann lays stress on the advantage of calculating the mean monthly and yearly extremes of temperature and pressure instead of merely quoting the absolute extreme readings, because the latter may only refer to any one of the years under discussion, and are not comparable with the results of a series of years.

AN interesting instance of that adaptability to changing tastes and conditions which is the mainspring of progress in industry as well as in science is afforded by a note in the *Journal* of the Society of Arts (July 18). For some years the demand for claret has greatly diminished in favour of the wines of Champagne, and has seriously affected the wine industry in the Bordeaux district. Several proprietors in the Médoc have, however, now commenced the production of sparkling wines by the same process as champagne is made, and their action has been the means of developing practically a new industry. It may at first seem strange that white wine should be able to be made in the Médoc, where only black grapes are grown, but as a matter of fact champagne is almost entirely made from black grapes, and the most celebrated vineyards in the Champagne district are all planted with them. The colour of the wine depends only on the way in which the wine is made. All the colouring matter is in the skin, while the fruit itself is colourless, or nearly so. If the

whole of the grape, skin and all, be allowed to ferment together, the colouring matter in the skin will be dissolved in the juice of the grape, and the wine produced will be red. If, on the contrary, the skin be removed before the fermentation begins, the wine will be white. Sparkling wines require much more working and preparation than still wines, and a second fermentation has to take place when the wine is in bottle, and it is this which gives the gas. The wine has to pass through a long series of operations, which have to be carried out, from first to last, under a perfectly even temperature. For this reason, the cellars in the Champagne district are dug out often to a great depth in the chalk. It would have been impossible to find such cellars in the Médoc, where the soil is of a gravelly nature, but at Bourg, on the right bank of the Gironde, opposite the Médoc vineyards, there are cliffs of Oolitic limestone, whence the stone has for centuries been quarried. The stone has been quarried out in long galleries, which are now adapted for cool cellars, with a perfectly even temperature all the year round, and in these the sparkling médoc is made in identically similar circumstances to the wines of Rheims or Epernay. It is stated that to the ordinary taster there is nothing but the label to distinguish the sparkling médoc from the best brands of champagne. Another white sparkling wine is made at St. Emilion, and the cellars are in the caves below the ruins of an old monastery, from which the wine takes its name.

IN a note contributed to the *Atti dei Lincei*, xi. (1) 10, by Signor E. Daniele, dealing with certain particular cases of motion of a point in a plane, we notice the following interesting conclusion:—"In the motion of a point under a central force, the trajectories can be divided into an infinity of isothermal orthogonal systems, when the force is proportional to any power of the distance."

THE theory according to which the properties of colloidal substances are attributed to particles in a fine state of suspension is advanced by Dr. J. Billitzer in a recent communication to the Vienna Academy (*Sitzungsberichte*, No. 9). The author starts with the assumptions that we have to deal with a fine suspension and that the particles of this are oppositely electrified to the fluid. From these hypotheses numerous important conclusions are derived, and an attempt has been made to answer the principal objections to the theory.

A MATHEMATICAL investigation of the principles of the seismograph is given by Dr. M. Contarini in the *Atti dei Lincei*, xi. (1) 10. In this paper the author passes from the problem of the motion of a chain of rigid bodies, the first of which is fixed to the ground by at least one point, to the special case of two bodies only. It is shown how with such a system it is possible to determine four out of the six components of the seismic disturbance. For the other two components an instrument resembling the Vicentini microseismograph may be used.

THE question as to whether bats are capable of transmitting bubonic plague is discussed by Dr. B. Gosio in the *Atti dei Lincei*, xi. (1) 10. During a recent small epidemic at Naples it was suspected that the disease emanated from a building completely isolated by walls from the town, and with separate drainage, and the idea suggested itself that the infection must have been carried by the numerous bats that were constantly flying around the building. Dr. Gosio accordingly made experiments by inoculating specimens of *Vespertilio noctula* with doses of the virus varying from 0.5 c.c. to 0.05 c.c. of cultures developed for twenty-four hours. The result was that in every case the bats contracted the disease and died in a comparatively short interval, and on examination all the organs of the dead animals were seen to be rich in germs. It is suggested that the

numerous parasites with which the bat is commonly affected may be the means of propagating the germs, and this view is confirmed by experiments previously made in the author's laboratory on the common flea. A further confirmation is afforded by the observation that subcutaneous injections of infected matter, even in small quantities, are sufficient to transmit the disease to bats.

THE *Zoologist* for July contains but two papers, the one, by Dr. A. G. Butler, on birds in captivity, the other, by the Messrs. Ticehurst, on birds met with in Finmark.

THE "corallines," or calcareous alga, of Japan form the subject of a memoir by Mr. K. Yendo in the second part of vol. xvi. of the *Journal* of the College of Science of Tokyo, the other two articles in the same issue being also devoted to botanical subjects.

IN the first part of vol. lxxii. of the *Zeitschrift für wissenschaftliche Zoologie*, Herr E. Schultz continues his studies in "regeneration," taking as his text the turbellarian worms. The superficial nerve-cells in the spinal chord of birds and reptiles form the subject of an article in the same journal by Herr A. Kölliker.

TO the *Aarbog* of the Bergen Museum for 1902, Mr. J. A. Grieg contributes a review of the echinoderms of northern Norway; while Mr. H. Friele describes the molluscs obtained during the cruise of the fishery steamer *Michael Sars* in the North Sea during the summer and autumn of 1900. In the latter paper several new forms are named. A third article, by Mr. H. H. Gran, forms the continuation of a memoir on marine bacteria.

IN a memoir on a new generic type (*Gephyrocrinus*) of crinoid dredged by the Prince of Monaco at a great depth in the Atlantic, the authors, Messrs. Koehler and Bather, state that it is allied to *Hyocrinus*, represented by a single species obtained by the *Challenger*. Only one specimen, and that imperfect, of the new form was obtained. The paper is published in vol. xv. of the *Mémoires* of the French Zoological Society.

FROM an article in the *Egyptian Gazette* we learn that the additions to the Zoological Gardens at Ghizeh during May and June were seventy-six in number, and include many very valuable and rare animals. Nearly all are natives of the Nile Valley except four Capuchin monkeys from South America, received in exchange, and a specimen of the two-humped Bactrian camel, which has been purchased and delivered in Egypt through the assistance of Dr. Büttikofer, the well-known Swiss naturalist, now Director of the Rotterdam Zoological Gardens, where this species of camel is bred with success. In Egypt, where the one-humped camel is so well known, it is specially interesting to be able to see a specimen of the two-humped camel, and to the native visitor it is perhaps the most astonishing animal in the menagerie.

AT a special memorial meeting held on April 25 of this year under the joint auspices of the Natural History Society, the Teachers' School of Science and the University of Boston (of which an account appears in vol. xxx. No. 4 of the *Proceedings* of the first-named society), addresses were delivered in commemoration of the work of the late Prof. A. Hyatt. According to the inaugural address, Hyatt was born at Washington in 1838 and died suddenly at Cambridge, Mass., in January of the present year on his way to attend a meeting of the Boston Natural History Society, of the museum of which he was so long curator. Hyatt "was professor of zoology and palæontology at the Massachusetts Institute of Technology from 1870 to 1888, and professor of biology at Boston University from 1877. He

was the founder of the seaside laboratory at Annisquam, and took the leading part in the foundation of the Teachers' School of Science and of the American Society of Naturalists."

ONE evening in the autumn of last year, while strolling on the beach of a small watering-place near Christchurch, New Zealand, Dr. A. Dendy picked up a small gelatinous object thrown up by the tide. On examination this object turned out to be a relatively large pelagic hydroid polyp. When found it was in a moribund condition, and the body was seen to be covered with a number of medusæ in various stages of development. A full account of this remarkable organism is given by its discoverer in the July issue of the *Quarterly Journal of Microscopical Science*. The organism, which is endowed with free-swimming power, indicates an entirely new type of hydroid, for which the name *Pelagohydra mirabilis* is proposed. Structurally it comes nearest to the aberrant *Corymorpha*. "It is a very curious fact," remarks the describer, "that two distinct genera of tubularian hydroids agreeing in such striking anatomical peculiarities should have become adapted to two such different modes of life, the one (*Pelagohydra*) swimming freely in the open ocean, and the other (*Corymorpha*) rooting itself in the sand at the bottom. . . . So far as I am aware, there is no other hydroid yet known which has become specially adapted to a pelagic mode of life."

A NEW popular edition of Mr. Oliver G. Pike's pleasantly written book entitled "In Bird-Land with Field-Glass and Camera" has been published by Mr. T. Fisher Unwin. The book is illustrated by eighty-three reproductions of photographs of birds and nests taken direct from nature by the author. A notice of the original edition, with one of the illustrations, appeared in *NATURE* two years ago (vol. lxii. p. 418).

MR. HENRY FROWDE will publish shortly the first instalment of the "Tebtunis Papyri" found by Dr. B. P. Grenfell and Dr. A. S. Hunt at Ûmm el Baragât in the south of the Fayûm and edited by them, with the assistance of Mr. J. Gilbert Smyly. This volume deals with the papyri in which the mummies of crocodiles were wrapped, and they date from the end of the second or the early part of the first century B.C. Mrs. Hearst supplied the funds for the excavations on behalf of the University of California, and this volume inaugurates a series of publications by the University dealing with Egyptian archæology. The book is being issued conjointly by the Egypt Exploration Fund to subscribers to the Græco-Roman branch.

IN the July number of the *Moniteur Scientifique*, Prof. Zinno describes a synthesis of tartaric acid suitable for the production of this substance on the large scale. The method consists in passing a current of carbonic acid gas under a pressure of about three atmospheres over potassium glycerate, the reaction being very similar to that of Kolbe by which sodium salicylate is produced. Potassium glycerate is easily obtained by oxidising glycerin by means of lead dioxide or minium and nitric acid, and then adding to the boiling solution of the lead salt potassium carbonate. Numbers are given in the paper which show that cream of tartar can be produced by this method at a cost which should justify the commercial development of the process.

THOSE who are interested in the sulphuric acid industry will find a noteworthy series of articles bearing upon the subject in the July number of the *Moniteur Scientifique* under the title "Grande Industrie Chimique." The first of these, by Messrs. Nidenführ and Luty, is entitled "A comparative economic study of the manufacture of sulphuric acid by the anhydride and the modern lead chamber processes." Much interesting matter is contained in the paper, and the authors arrive at the conclusion that at the present time the lead chamber processes, when conducted properly, are considerably more economical than the

contact processes, so far as the production of acids which are not very concentrated is concerned. For the manufacture of the strongest acids, however, numbers are given which indicate that the contact process is considerably superior to the older process from the commercial point of view. The other articles on the subject deal with more recent alterations which have been made in the lead chamber process, the theory and practice of sulphuric acid manufacture and the treatment of platinum residues.

THE additions to the Zoological Society's Gardens during the past week include a Side-striped Jackal (*Canis lateralis*), a Young Leopard (*Felis pardus*), a Spotted Hyæna (*Hyaena crocuta*), a Harnessed Antelope (*Tragelaphus scriptus*), a Nagor Antelope (*Cervicapra redunca*), a Marabou Stork (*Leptoptilus crumeniferus*), a White-necked Crow (*Corvus scapularis*), a Spur-winged Goose (*Plectropterus gambensis*), two Red-backed Pelicans (*Pelecanus rufescens*) from Gambia, West Africa, presented by Captain Sir George C. Denton, K.C.M.G.; a Striped Hyæna (*Hyaena striata*) from Gambia, West Africa, presented by Captain MacCarthy Morrogh; a Black-eared Marmoset (*Hapale penicillata*) from South-east Brazil, presented by Mrs. Armin Thornton; a Yellow-fronted Amazon (*Chrysotis ochrocephala*) from Guiana, presented by Miss Ellen Cull; a Red-winged Parrakeet (*Pittes erythropterus*) from Australia, presented by Miss E. P. France; a Pale-headed Parrakeet (*Platyercus pallidiceps*) from Australia, presented by Mr. Thomas Morson; a West African Python (*Python sebae*) from West Africa, presented by the Rev. H. Ross Phillips; two European Tree Frogs (*Hyla arborea*), European, presented by Mrs. Sidney Wolton; a Thar (*Hemitragus jemlaica*), a Yak (*Poephagus grunniens*) born in the Gardens.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES IN AUGUST:—

- August 1. 15h. 25m. to 19h. 8m. Transit of Jupiter's Sat. III.
4. 11h. 34m. to 16h. 29m. Transit of Jupiter's Sat. IV.
5. 5h. Jupiter in opposition to the sun.
8. 12h. 38m. Minimum of Algol (β Persei).
10. 8h. 29m. to 9h. 32m. Moon occults δ Libræ (mag. 5.3).
10. 8h. 41m. to 9h. 35m. Moon occults α Libræ (mag. 3.0).
11. 9h. 27m. Minimum of Algol (β Persei).
- 11-12. Maximum of the Perseid meteoric shower.
15. Venus. Illuminated portion of disc = 0.886. Mars = 0.965.
18. 17h. 1m. to 17h. 22m. Moon occults ϵ^1 Capricorni (mag. 5.2).
28. Saturn. Outer minor axis of outer ring = $16''\cdot48$.
30. 4h. 37m. to 8h. 20m. Transit of Jupiter's Sat. III.
31. 11h. 10m. Minimum of Algol (β Persei).

A NEW ALGOL VARIABLE.—Prof. Pickering announces the discovery of a new Algol variable ($+43^\circ 41'01''$) by Mrs. Fleming, at the Harvard College Observatory.

Two plates, taken with the 8-inch Draper telescope on March 7, 1900, and April 3, 1902, respectively, were being examined in order to discover, if possible, a trace of the image of Comet 1902 α on the latter plate. This search was unsuccessful in its immediate object, but Mrs. Fleming noticed that the image of a faint star, the position of which for 1900 was R.A. = 21h. 55.2m., Dec. = $+43^\circ 52'$, showed a variation in magnitude during the interval between the taking of these two plates, and on examining more plates it was found that generally the light was bright and constant, thus showing the star to be of the Algol type.

The period is about 31.4 days, and the star retains its maximum brightness (photographic magnitude = 8.9) for twenty-eight days and then decreases to minimum by the following steps:—9.0 m. at 1.05 d. before minimum, 9.5 at 0.94 d., 10.0 at 0.84 d., 10.5 at 0.71 d., 11.0 at 0.58 d., and 11.5 at 0.43 d.

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The light then remains constant at 11.6 m. for more than half a day. The times of increase are apparently the same as those of decrease, but this is not conclusively indicated. (*Astrophysical Journal*, No. 5, vol. xv.)

SPECTROSCOPY OF THE SOLAR ECLIPSE OF MAY 18, 1901.—In No. 5, vol. xv. of the *Astrophysical Journal*, Mr. W. J. Humphreys gives an account of the United States Naval Observatory Eclipse Expedition to Sumatra last year, and a reduction of the spectrograms obtained.

Excellent photographs of the corona were obtained, the cœlostast used having a mirror at either end of its heavy polar axis, one supplying the light to the coronagraph, the other to the spectroscope.

The concave grating used was of 30 feet focal length and had a diffracting surface 8 inches long and 5 inches wide; the whole of this area was not used, however. To obtain good uniform focus heavy celluloid films were used, and these were $2\frac{1}{2}$ inches wide and 36 inches long.

Six films were exposed, and the reductions of the spectra are set out in tabular form, 330 lines between $\lambda 3118$ and $\lambda 5204$ having been measured. Neglecting those due to hydrogen and helium, the lines are chiefly those belonging to the Mendeléeff series which terminates with the Fe, Ni, and Co groups.

Incidentally observing the shadow bands, Mr. Humphreys found that they were stationary at first, but another observer noted that afterwards they widened out and then attained an increasing velocity.

Mr. Humphreys concludes his report with some useful suggestions which might be profitably considered by future eclipse observers.

REPORT OF THE CAPE OBSERVATORY FOR 1901.—Sir David Gill, in this report, announces the completion and official inauguration of the 24-inch "Victoria" telescope presented to the observatory by Dr. Frank McClean.

The transit circle has been completed and effectively mounted, the house being of a semi-cylindrical form, of which the two halves may be drawn aside at right angles to the axis when observations are to be taken. Owing to the loose nature of the upper rocks, the standard azimuth marks have had to be placed on the surface of the solid rock at the bottom of shafts some 30 feet deep, from which the marks are reflected to the instrument. The heliometer has been cleaned and repaired, and observations of the oppositions of Mars, Jupiter and Saturn have been made. Some thirty observations of the distances and position angles of Jupiter's satellites have also been completed.

The equatorials have been used for observing the phenomena attending ninety-seven separate occultations, to observe Giacobini's comet and the great comet of 1901, and to seek, without success however, for Encke's comet. Thirteen previously unrecorded double stars have been detected by Mr. Innes, the most interesting of them being τ_2 Lupi, h 4625 (chief star) and C.G.A. 2861. The 7-inch equatorial has been used for the revision of the C.P.D., and incidentally the unsuspected variability of the following stars has been detected:—C.P.D. — $51^\circ 22'75''$, anonymous, Cor. D.M. — $22^\circ 14'78''$, the ranges of variability being from 8.6 m., 9.8 m. and 9.4 m. to invisibility respectively. The character of the second star is not completely known yet, but it is suggested that it may be a Nova, R.A. = 11h. 14m. 14s., Dec. = $61^\circ 10' S.$ (1875).

The geodetic work has been actively prosecuted throughout the year, the geodetic arc of meridian having now been carried to the Zambesi, and an effective service of time signals has been distributed throughout the Colony.

WORK AT THE ATHENS OBSERVATORY.¹

YEARS ago, under the vigorous direction of the late Prof. Schmidt, the Athens Observatory acquired a distinction that was denied to some kindred institutions more favoured with instrumental equipment and substantial endowment. Since that time evil days have fallen on the National Observatory of Greece and its record of useful work has been broken; but it is now a pleasant task to record that a period of renewed activity appears likely to make itself felt in the future conduct of this ancient centre of scientific work. The third volume of the

¹ "Annales de l'Observatoire National d'Athènes." Publiées par Démétrius Eginitis, Directeur de l'Observatoire. Tome iii. Pp. 376. (Athènes: Imprimerie Royale Raftanis-Papageorgiou, 1901.)